

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : NIPPON STEEL CORP

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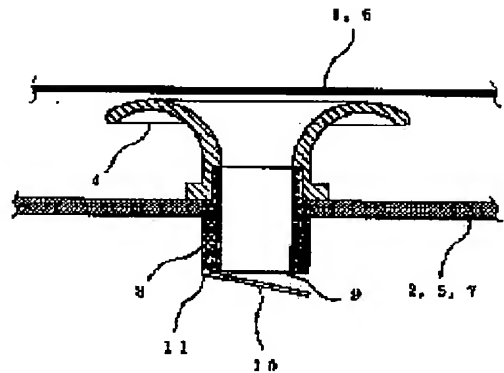
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(54) FLUID FLOATING-UP CONVEYING DEVICE

(57)Abstract:

PURPOSE: To convey a steel strip or a steel sheet while floating up in a high efficiency by effectively using the air for floating-up to the max. limit without using a complicated electrical control device, etc., in the floating-up conveying device for steel strip or steel sheet.

CONSTITUTION: In the device for conveying the steel strip or the steel sheet 1 while floating up with fluid, plural rubber pads 4 are arranged in the advancing direction of the sheet and in the width direction of the sheet and a flapper 10 is arranged at each air flowing inlet 9 of a part or all of the pads 4 and a rigid body 11 is arranged at the supporting part of the flapper. By this method, without using the complicated electrical control device, etc., the air supplying quantity for floating-up can automatically be optimized according to the passed sheet width and position, and gas energy for floating-up can be saved.



LEGAL STATUS

[Date of request for examination]

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CLAIMS

[Claim(s)]

[Claim 1] The fluid floatation type transport device characterized by having prepared two or more rubber slab in the plate travelling direction and the direction of the board width, having prepared the flapper in a part or the air input of all rubber slab in the equipment which a steel strip or a steel plate is surfaced by the fluid, and conveys it, and arranging the rigid body in this flapper's supporter.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the equipment which a steel strip and a steel plate are surfaced by the fluid, and conveys them.

[0002]

[Description of the Prior Art] In recent years, in order to avoid the roll contact crack by using a roll in a steel strip or the carrier facility of a steel plate, to convey by non-contact is tried, but in order to consume fluids, such as air, to a large quantity, it is required to consider as the carrier facility using a necessary minimum air content according to the board width of a steel strip or a steel plate. For example, in JP,2-166236,A, when the board width of a steel strip differs from the chamber equipped with many nozzles for the floater which supports a steel strip by non-contact by constituting from a side plate of a movable couple in the direction of the board width, and moving spacing of a side plate according to the board width on a nozzle forming face, to use a necessary minimum air content is tried.

[0003]

[Problem(s) to be Solved by the Invention] By the above-mentioned approach, the equipment to which a side plate is moved according to the board width of a steel strip is needed. However, generally The movement magnitude of a side plate is calculated based on the information on a steel strip dimension and the signal of a board width sensor in an operation managerial system. The complicated electric control unit which emits an instruction is needed for a side plate driving gear based on the result of an operation. There is a danger of it not only causing buildup of facility cost, but causing lowering of facility dependability. Further In order to avoid the minor collision of a steel strip and a side plate, it is necessary to move a side plate with allowances to actual board width fluctuation, and there is a trouble of being in the condition that the side plate opened in the conveyance early stages of a narrow-width steel strip and the last stage, and consuming unnecessary air. Moreover, in carrying out floatation conveyance of the cutting plate-like steel plate by the above-mentioned method, a chamber is divided into a plate travelling direction, the equipment which controls the air content to the chamber concerned is also needed according to the location of the travelling direction of a steel plate, and it results in causing buildup of facility cost increasingly.

[0004]

[Means for Solving the Problem] The air for floatation is utilized for the maximum validity, without this invention's solving the above-mentioned problem and using a complicated electric control unit etc. The place which is made to carry out floatation conveyance of a steel strip or the steel plate efficient, and is made into the summary In the equipment which a steel strip or a steel plate is surfaced by the fluid, and conveys it, two or more rubber slab is prepared in a plate travelling direction and the direction of the board width, a flapper is prepared in a part or the air input of all rubber slab, and it is in the fluid floatation type transport device characterized by arranging the rigid body in this flapper's supporter.

[0005] This invention is explained to a detail according to a drawing below. Drawing 1 is the perspective view of the floatation type transport device of the steel strip which consists of the rubber slab concerning this invention. As shown in drawing 1 , the floatation type transport device 2 which consists of the rubber slab installed in the plate travelling direction and the direction of the board width is constituted so that floatation of a steel strip 1 can be properly used according to change of the

double-width and narrow-width steel strip 1. [two or more] That is, in the case of a narrow-width steel strip, it is constituted so that both the rubber slab 3 without a flapper, and the rubber slab [in the case of a double-width steel strip] 3 without a flapper and the rubber slab 4 with a flapper may operate freely.

[0006] Drawing 2 is the perspective view of the floatation type transport device for directional change of the steel strip which consists of the rubber slab concerning this invention. As shown in drawing 2, the floatation type transport device 5 for directional change which consists of the rubber slab installed in the plate travelling direction and the direction of the board width is constituted so that floatation of a steel strip 1 can be properly used according to change of the double-width and narrow-width steel strip 1. [two or more] That is, in the case of a narrow-width steel strip, it is constituted so that both the rubber slab 3 without a flapper, and the rubber slab [in the case of a double-width steel strip] 3 without a flapper and the rubber slab 4 with a flapper may operate freely.

[0007] Drawing 3 is the perspective view of the floatation type transport device of the cutting plate-like steel plate which consists of the rubber slab concerning this invention. As shown in drawing 3, the floatation type transport device 7 which consists of the rubber slab installed in the plate travelling direction and the direction of the board width is constituted so that floatation of a steel plate 6 can be properly used according to the location of the travelling direction of a steel plate 6, and the direction of the board width. [two or more] That is, it is constituted so that the rubber slab 4 with a flapper may operate freely according to the location of the travelling direction of a steel plate, and the direction of the board width.

[0008] Drawing 4 is the sectional view of the rubber slab concerning this invention. When form a flapper 10 in the air supply opening 9 of the barrel 8 of the lower part of rubber slab 4 as shown in drawing 4, and it is made to attach idly to this flapper's 10 end with the rigid body 11 of a flapper supporter and there is not a steel strip 1 or a steel plate 6, a flapper 10 closes closing and the air supply opening 9 with an air supply pressure automatically, and he is trying for an air leak to hardly arise. Moreover, since there are only few pressure differentials in air feed hopper ON appearance when there are a steel strip 1 and a steel plate 6, according to the rigid force of the elastic body 11 which supports a flapper 10, a flapper 10 overcomes few pressure differentials of air feed hopper ON appearance, and surfaces an aperture, a steel strip 1, or a steel plate 6 automatically.

[0009] However, when the steel strip 1 and steel plate 6 which suited on rubber slab 4 at first are lost by those migration, in order for the flapper 10 who suited the open condition to be pushed against the air supply opening 9 by the pressure of air and to shift to a closed state automatically, it is important to make the include angle of the effective area of a flapper 10 and the air supply opening 9 in an open condition into 90 or less degrees. Moreover, when the steel strip 1 and steel plate 6 which were not on rubber slab 4 at first come on rubber slab 4 by those migration, in order for the flapper 10 who suited the closed state to shift to an open condition automatically, it is important to establish few clearances in the flapper 10 and the air supply opening 9 in a closed state, and to make air they flow in slightly in rubber slab 4. When a steel strip 1 and a steel plate 6 come on rubber slab 4 by few of this clearance, rubber slab 4 internal pressure rises with inflow air, the pressure differential of air feed hopper ON appearance is almost lost, and a flapper 10 shifts to an open condition automatically.

[0010] According to research of artificers, to the opening area of the air supply opening 9 at the time of flapper 10 full admission, the opening area by few of this clearance is good at about about 1 / 100 to 1/1000, and it should just give irregularity so that the opening area at the time of flapper 10 close by-pass bulb completely may become about about 1 / 100 to 1/1000 at the effective area of the air supply opening 9. Moreover, effectiveness with the same said of opening and putting a small hole on a flapper 10 can be demonstrated instead of giving irregularity. Thereby, the amount of air leaks at the time of flapper 10 close by-pass bulb completely becomes 1% or less, and can almost be disregarded. Moreover, as an elastic body, it is desirable to use a spring etc.

[0011] Namely, while not surfacing the steel strip or the steel plate Rubber slab 4 internal pressure is almost equal to an open air pressure, and it sets to the air feed hopper ON appearance of rubber slab. While surfacing the steel strip or the steel plate to the pressure differential of an air supply pressure and an open air pressure having arisen about Since the air included in rubber slab flows into the open air through a slit with a steel strip or a steel plate, in the clearance section, a big pressure differential is produced, and rubber slab internal pressure becomes quite higher than an outside atmospheric pressure,

and becomes close to an air supply pressure. Therefore, by preparing a flapper in the air feed hopper ON appearance of rubber slab, and setting up the elastic force of a flapper supporter appropriately so that a flapper may open, when the pressure differential of an air supply pressure and an open air pressure has arisen about in air feed hopper ON appearance and there is [closing and rubber slab internal pressure / near and a pressure differential] no flapper in an air supply pressure not much, it constitutes so that a flapper may open and close automatically according to the existence of a steel strip or a steel plate. [0012] Thus, when the steel strip or the steel plate was surfaced directly conventionally, whenever the board width and a travelling direction location changed, the air leak countermeasures from a floatation type transport device had been needed, but even if it was unnecessary in this countermeasure, and there was always various board width modification of a steel strip or the travelling direction location of a steel plate changed, the countermeasures for it became completely unnecessary.

[0013]

[Effect of the Invention] Without using a complicated electric control unit etc. by carrying out this invention, as stated above, according to the board width and the location which carry out plate leaping with simple equipment, the amount of supply of the air for floatation can be optimized automatically, and much outstanding effectiveness -- reduction of the gas energy for floatation can be aimed at -- is done so.

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TECHNICAL FIELD

[Industrial Application] This invention relates to the equipment which a steel strip and a steel plate are surfaced by the fluid, and conveys them.

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PRIOR ART

[Description of the Prior Art] In recent years, in order to avoid the roll contact crack by using a roll in a steel strip or the carrier facility of a steel plate, to convey by non-contact is tried, but in order to consume fluids, such as air, to a large quantity, it is required to consider as the carrier facility using a necessary minimum air content according to the board width of a steel strip or a steel plate. For example, in JP,2-166236,A, when the board width of a steel strip differs from the chamber equipped with many nozzles for the floater which supports a steel strip by non-contact by constituting from a side plate of a movable couple in the direction of the board width, and moving spacing of a side plate according to the board width on a nozzle forming face, to use a necessary minimum air content is tried.

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EFFECT OF THE INVENTION

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the above-mentioned approach, the equipment to which a side plate is moved according to the board width of a steel strip is needed. However, generally The movement magnitude of a side plate is calculated based on the information on a steel strip dimension and the signal of a board width sensor in an operation managerial system. The complicated electric control unit which emits an instruction is needed for a side plate driving gear based on the result of an operation. There is a danger of it not only causing buildup of facility cost, but causing lowering of facility dependability. Further In order to avoid the minor collision of a steel strip and a side plate, it is necessary to move a side plate with allowances to actual board width fluctuation, and there is a trouble of being in the condition that the side plate opened in the conveyance early stages of a narrow-width steel strip and the last stage, and consuming unnecessary air. Moreover, in carrying out floatation conveyance of the cutting plate-like steel plate by the above-mentioned method, a chamber is divided into a plate travelling direction, the equipment which controls the air content to the chamber concerned is also needed according to the location of the travelling direction of a steel plate, and it results in causing buildup of facility cost increasingly.

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MEANS

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[0012] Thus, when the steel strip or the steel plate was surfaced directly conventionally, whenever the board width and a travelling direction location changed, the air leak countermeasures from a floatation type transport device had been needed, but even if it was unnecessary in this countermeasure, and there was always various board width modification of a steel strip or the travelling direction location of a steel plate changed, the countermeasures for it became completely unnecessary.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The perspective view of the floatation type transport device of the steel strip which consists of the rubber slab concerning this invention,

[Drawing 2] The perspective view of the floatation type transport device for directional change of the steel strip which consists of the rubber slab concerning this invention,

[Drawing 3] The perspective view of the floatation type transport device of the cutting plate-like steel plate which consists of the rubber slab concerning this invention,

[Drawing 4] It is the sectional view of the rubber slab concerning this invention.

[Description of Notations]

1 Steel Strip

2 Floatation Type Transport Device of Steel Strip

3 Flapper-less Rubber Slab

4 Rubber Slab with Flapper

5 Floatation Type Transport Device for Directional Change of Steel Strip

6 Steel Plate

7 Floatation Type Transport Device of Steel Plate

8 Barrel

9 Air Supply Opening

10 Flapper

11 Elastic Body of Flapper Hinge

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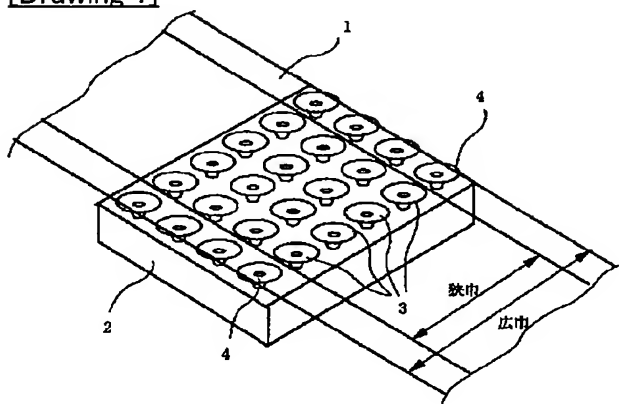
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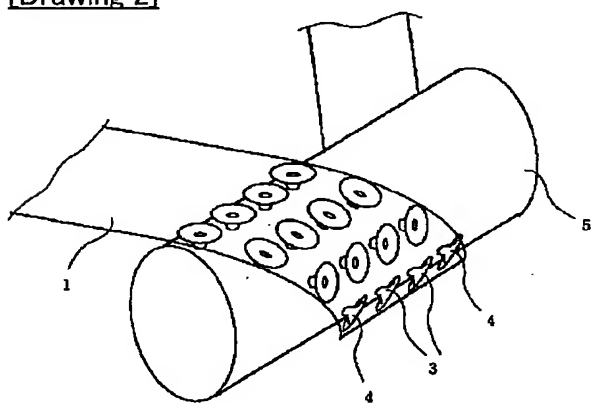
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DRAWINGS

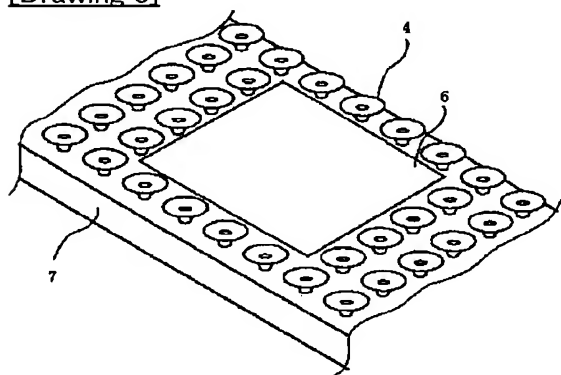
[Drawing 1]



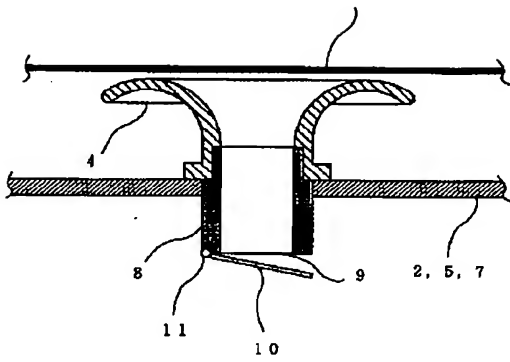
[Drawing 2]



[Drawing 3]



[Drawing 4]



[Translation done.]